CLAIMS:

1. A handheld device loudspeaker system comprising:

a first loudspeaker that emits a first acoustic wave that is substantially omnidirectional, said first loudspeaker being described by a first electric-to-acoustic signal transfer function for acoustic signals radiated in a first direction;

a second loudspeaker that emits a second acoustic wave in the first direction and emits, in a second direction that is opposite the first direction, a third acoustic wave that is opposite in phase relative to the second acoustic wave, said second loudspeaker being described by a second electric-to-acoustic signal transfer function for acoustic signals radiated in the first direction; and

one or more drive circuits coupled to the first loudspeaker, and the second loudspeaker, said one or more drive circuits comprising:

a first signal processing circuit for performing one or more filter functions, wherein the one or more filter functions compensate for a difference between the first electric-to-acoustic signal transfer function, and the second electric-to-acoustic signal transfer function.

2. The handheld device loudspeaker system according to claim 1 wherein:

the first loudspeaker comprises a monopole loudspeaker; and

the second loudspeaker comprises a dipole loudspeaker.

3. The handheld device loudspeaker system according to claim 2 wherein:

the first loudspeaker comprises a diaphragm that has a diameter that is equal to one-quarter or less of a minimum wavelength that corresponds to a maximum frequency of audio signals used to drive the first loudspeaker and the second loudspeaker.

4. The handheld device loudspeaker system according to claim 1 wherein:

the first loudspeaker comprises a first driven member having a first major surface and a second major surface opposite the first major surface, and wherein only said first major surface is coupled to air outside the handheld device loudspeaker system;

the second loudspeaker comprises a second driven member having a third major surface and a fourth major surface opposite the third major surface, and wherein both the third major surface and the fourth major surface are coupled to air outside the handheld device loudspeaker system.

5. The handheld device loudspeaker system according to claim 4 comprising:

a first resonator chamber including a first opening;

a second resonator chamber disposed adjacent said first resonator chamber, said second resonator chamber including a second opening, wherein said first opening is coplanar with said second opening, and spaced from said second opening by a distance; and

a speaker holder including a first bore, and a second bore spaced from said first bore by the distance, wherein said first loudspeaker is located in said first bore, and said second loudspeaker is located in said second bore, said speaker holder further including a rotatable coupling located concentrically about said first bore, wherein said rotatable coupling is rotatably engaged in said first opening;

whereby, the second bore of said speaker holder with the second loudspeaker can be rotated away from said second resonator or into alignment with said second opening so as to convert said second loudspeaker into an omnidirectional loudspeaker.

6. The handheld device loudspeaker system according to claim 4 wherein:

said fourth major surface is acoustically coupled to a closeable acoustic port that leads to air outside the handheld device loudspeaker system;

whereby, upon closing said closeable port, said second loudspeaker is caused to emit a fourth acoustic wave that is substantially omni directional.

7. The handheld device loudspeaker system according to claim 6 wherein:

said first loudspeaker is backed by a first acoustic cavity; and

said second loudspeaker is backed by a second acoustic cavity that includes said closeable acoustic port.

8. The handheld device loudspeaker system according to claim 1 wherein the first signal processing circuit comprises:

a programmable processor; and

a program memory for storing a program for performing the one or more filter functions, said program memory being coupled to the programmable processor for transferring program instructions from the program to the programmable processor.

9. The handheld device loudspeaker system according to claim 1 wherein:

the one or more filter function includes one or more filter function for each particular direction of a plurality of directions, wherein said one or more filter function for each particular direction include a frequency dependent magnitude that compensates for a difference between magnitudes of transfer functions of the first and second loudspeakers, and each filter function further includes a frequency dependent phase that steers acoustic waves in the particular direction.

10. The handheld device loudspeaker system according to claim 1 further comprising:

a resonator including an opening, wherein said first loudspeaker is mounted in said opening;

a hinge attached to the resonator, proximate said opening; and

a lid including said second loudspeaker attached by said hinge to said resonator;

whereby, said second loudspeaker can be swung from a first position that is laterally separated from said first loudspeaker into a second position over said first loudspeaker.

11. The handheld device loudspeaker system according to claim 10 wherein:

said first loudspeaker comprises a first diaphragm;

said second loudspeaker comprises a second diaphragm;

said loudspeaker system further comprises a sensor for producing a sensor signal that is indicative of whether said second loudspeaker is in said first position or said second position; and

wherein, said one or more drive circuits are adopted to respond to said sensor signal by changing a phase of signals applied to either said first loudspeaker or said second loudspeaker, such that driving of said first loudspeaker diaphragm and said second loudspeaker diaphragm will be substantially synchronized when said second loudspeaker is in said second position over said first loudspeaker;

whereby, when said second loudspeaker is in said second position over said first loudspeaker, the handheld device loudspeaker system is reconfigured as a substantially isobarik loudspeaker.

12. The handheld device loudspeaker system according to claim 1 further comprising:

a third loudspeaker that emits a fourth acoustic wave that is substantially omnidirectional;

a fourth loudspeaker that emits a fifth acoustic wave in a third direction and emits, in a fourth direction that is opposite the third direction, a sixth acoustic wave that is opposite in phase relative to the fifth acoustic wave;

wherein said one or more drive circuits comprise a pair of stereo signal sources including a left side signal source, and a right side signal source, wherein said left side signal source is coupled to said first loudspeaker and said second loudspeaker; and said right side signal source is coupled to said third loudspeaker and fourth loudspeaker; and

wherein, said one or more drive circuits further comprise a second signal processing circuit for performing one or more filter functions on at least a signal applied to one of said third and fourth loudspeakers for compensating for a difference between electric-to-acoustic signal transfer functions of said third and fourth loudspeakers.

13. The handheld device loudspeaker system according to claim 1 further comprising:

a third loudspeaker that emits a fourth acoustic wave in a third direction and emits, in a fourth direction that is opposite the third direction a fifth acoustic wave that is opposite in phase relative to the fourth acoustic wave;

wherein said one or more drive circuits comprise a pair of stereo signal sources including a left side signal source, and a right side signal source, wherein said left side signal source is coupled to said first loudspeaker and said second loudspeaker, and said right signal source is coupled to said first loudspeaker and said third loudspeaker; and

wherein said one or more drive circuits comprise a second signal processing circuit for performing one or more filter functions on at least a signal applied to said third loudspeaker for compensating for a difference between electric-to-acoustic signal transfer functions of said first and third loudspeakers.

14. A wireless communication device comprising:

a transceiver for receiving wireless signals that include audio signals;

a processor coupled to the transceiver for processing said audio signals included in said wireless signals;

a first loudspeaker coupled to said processor, wherein said first loudspeaker emits a first acoustic wave that is substantially omnidirectional, said first loudspeaker being described by a first electric-to-acoustic signal transfer function for acoustic waves radiated in a first direction;

a second loudspeaker coupled to said processor, wherein said second loudspeaker emits a second acoustic wave in the first direction and emits, in a second direction that is opposite the first direction, a third acoustic wave that is opposite in phase relative to the second acoustic wave, said second loudspeaker being described by a second electric-to-acoustic signal transfer function for acoustic waves radiated in the first direction; and

a program memory coupled to the processor, said program memory including a first program that is executed by the processor, wherein said processor is programmed by said first program to:

apply one or more filter functions to said audio signals, wherein one or more filter functions compensate for a difference between the first electric-to-acoustic signal transfer function, and the second electric-to-acoustic signal transfer function; and

drive said first and second loudspeakers with said audio signals.

15. The wireless communication device according to claim 14 further comprising:

a plurality of microphones coupled to said processor,

wherein said program memory also includes a second, direction of arrival algorithm that programs said processor to determine a direction from which a user's voice is received by said plurality of microphones; and

wherein said processor is further programmed by said first program to select a filter function based on the direction from which the user's voice is received in order to steer sound radiated by said first loudspeaker and said second loudspeaker in the direction from which the user's voice was received.

16. The wireless communication device according to claim 14 wherein said program memory also includes a second program for varying a degree of directionality of audio emitted by the first and second loudspeakers by adjusting relative amplitudes of a first audio signal applied to the first loudspeaker and a second audio signal applied to the second loudspeaker.